

To: Matt Francis[m.francis@erllc.com]; Way, Steven[way.steven@epa.gov]
Cc: Petri, Elliott[Elliott.Petri@WestonSolutions.com]
From: Christner, Jan
Sent: Tue 10/13/2015 7:14:47 PM
Subject: RE: Soil Samples
Gold King Mine Soil Analytical Results.docx

Based on the analytical results we got last week, we could use another truck of the lime. My calculations gave a total lime requirement of 38.5 tons for the 2 acres if we mix it in 6". See attached table that shows the analytical results plus the amount of lime for each area. The estimate for the miscellaneous areas was calculated using the average lime requirement for the three main reclamation areas.

Let me know if you have questions.

Jan

From: Matt Francis [mailto:m.francis@erllc.com]
Sent: Monday, October 05, 2015 10:02 AM
To: Christner, Jan; 'way.steven@epa.gov'
Cc: Anne Winckel (Anne.Winckel@respec.com); Petri, Elliott
Subject: RE: Soil Samples

CaCO₃ Lime ordered. It is 84- 85% CaCO₃ and 80+% passes 200mesh screen. I ordered one truck which is 24T. It is scheduled to arrive by end of week. Let me know if plan changes. I'll provide a spec sheet shortly.

From: Christner, Jan [mailto:Jan.Christner@WestonSolutions.com]
Sent: Sunday, October 04, 2015 11:36 AM
To: 'way.steven@epa.gov' <way.steven@epa.gov>
Cc: Anne Winckel (Anne.Winckel@respec.com) <Anne.Winckel@respec.com>; Petri, Elliott <Elliott.Petri@WestonSolutions.com>; Matt Francis <m.francis@erllc.com>
Subject: FW: Soil Samples

Hi, Steve and all.

Lee sampled the reclamation areas last week but we didn't submit the samples for analysis because the labs had a long turnaround time and the reclamation plan was due Monday (10/5), before the analysis would be done. He was going to run the paste pH's but that didn't happen.

The current folks re-sampled and the results show very low soil pH. We'd be ok with a somewhat low pH (5.5-6) since this is a pine forest where soils typically have relatively low pH, but these are lower than that. I think we need to add some lime to give any vegetation a chance. (Note the poor vegetation in the previous reclamation area at the new Gladstone ponds, likely the product of low pH.)

That said, all lime is not equal. If we apply the quick lime at the site, we could burn the seed unless we let the areas sit awhile. Given the current date and the need to seed and place the erosion blanket before snow, that's not the best solution. If we could get some ag lime with relatively fine particle size that would be best. Since we don't have the acid base account, we can do a rough estimate on lime requirement. How about if we get 20 tons calcium carbonate equivalents of lime with particle size <2mm. So 20 tons of lime if the CaCO_3 is 100%. If the CaCO_3 is <100, you can get $20/\text{CaCO}_3\%$ equivalents. For example, if the lime has 80% (0.8) CCE, you'd get $20/0.8 = 25$ tons.

New recipe (I'll adjust the reclamation plan Tuesday):

- . Apply lime evenly over the area.
- . Mix into the soil 6 inches.
- . Apply compost evenly over the soil, mix into soil 3 to 6 inches.
- . Install drainage features.
- . Seed.
- . Apply erosion control blanket.

Let me know if you have questions or want additional information. I'll still be in Denver Monday (closing on my dad's house mid-afternoon), but I'm happy to answer questions if it will prevent delays in ordering materials.

Jan

From: Anne Winckel [<mailto:Anne.Winckel@respec.com>]
Sent: Saturday, October 03, 2015 5:36 PM
To: Christner, Jan
Subject: Re: Soil Samples

Hi Jan,

The ph and temp readings are as follows:
Rec Area 1, pH=3.68, temp=13.92 C

Rec Area 2, pH=4.08, temp=11.07 C

Rec Area 3, pH=3.99, temp=10.41 C

Please let me know if you need additional data.

Anne

From: Christner, Jan <Jan.Christner@WestonSolutions.com>
Sent: Friday, October 2, 2015 6:05 PM
To: Lee Ellmaker
Cc: Anne Winckel; Petri, Elliott
Subject: RE: Soil Samples

Anne,

Please collect composite samples from the three revegetation areas and do the paste pH's. See the attached map. One sample per area from the top 4-6 inches of soil. The areas should be kind of obvious because they are disturbed from recent activities (loose soil, etc.) Thanks.

Jan

From: Lee Ellmaker [<mailto:lee.ellmaker@mecx.net>]
Sent: Friday, October 02, 2015 6:01 PM
To: Christner, Jan
Cc: Anne Winckel; Petri, Elliott
Subject: Re: Soil Samples

I can tell Anne were to collect three more samples if you would like.

Sent from my iPhone

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fax 713.585.7049

office 713.585.7000 x 7009

8864 interchange drive

houston, texas 77054

lee.ellmaker@mecx.net

On Oct 2, 2015, at 6:57 PM, Christner, Jan <Jan.Christner@WestonSolutions.com> wrote:

I wanted the paste pH. We just didn't send them to the lab because the turnaround time was too long.

From: Lee Ellmaker [<mailto:lee.ellmaker@mecx.net>]
Sent: Friday, October 02, 2015 5:56 PM
To: Anne Winckel
Cc: Christner, Jan; Petri, Elliott
Subject: Re: Soil Samples

I thought you wanted the paste pH on the three samples I collected for you, but Elliott thought you did not want anything from those any more. So I'm not clear what you want.

Sent from my iPhone

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On Oct 2, 2015, at 5:40 PM, Anne Winckel <Anne.Winckel@respec.com> wrote:

Hi Jan,

Are we talking about the soil/sediment sample that was collected during the large "county sampling event"? I know Dave Robinson collected three jars and drove them to the lab on Tuesday night.

For the paste pH, I understand it is a requested laboratory analysis. I don't have the results of the analysis. Are you sure I am the one with this information?

Anne

From: Lee Ellmaker <lee.ellmaker@mecx.net>
Sent: Friday, October 2, 2015 9:54 AM
To: Christner, Jan
Cc: Anne Winckel
Subject: Re: Soil Samples

I'm on my way home, Anne will be able to get that for you.

Sent from my iPhone

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On Oct 2, 2015, at 9:36 AM, Christner, Jan
<Jan.Christner@WestonSolutions.com> wrote:

Hi, Lee.

Did you ever get the chance to run the paste pH on the soil samples you collected when I was there. The lab's turnaround time was too great to get the results back in time, but the pH values would help. If we could get XRF also, that would be good.

I don't know if you're still there, so I'm cc-ing Anne on this.

Jan

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